

**VOICE OVER IP DEVICE CAPABLE OF AUTO-SELECTIVELY DIALING UP
PUBLIC SWITCH TELEPHONE OR INTERNET PHONE AND THE METHOD
THEREOF**

5 **FIELD OF THE INVENTION**

The invention relates to a voice over IP device, more particularly to a voice over IP device capable of auto-selectively dialing up public switch telephone or internet phone and the method thereof.

10 **PRIOR ART**

Whereas the last decades, due to rapid development in science and technology industry, living and working pace for human being speed up with present hard competitive market, and convenient and rapid traffic facilities also make industry and commerce development region gradually expand. People live with daily busy schedule, to enhance communication efficiency, and further improve quality for work and life, the degree for depending on communication devices, such as telephone, etc., is steadily on the increase. Nowadays, communication devices, such as telephone, etc., not only become necessary communication means in peoples' daily life and work, and under some emergency, the apparatus may further become a life-saving means. Therefore, under any time and condition, to ensure the communication apparatus being unimpeded becomes focus which general users and communication service provider all concern about.

During recent years, due to the new developed voice over IP device(VoIP), which provides with a relatively cheap charge standard for users who usually use long-distance or international telephone to proceed communication, which makes the said users indeed find that using the said VoIP to proceed communication can save considerable

communication expense than former telephone using public switch telephone network(PSTN). Whereas, providers make investigative research aiming at the requirement and tendency, the result of which exhibits that there are up to 70% traditional PSTN users represent they are interested in changing to proceed
5 communication on line using VoIP to effectively reduce the expense on communication.

However, at present, all VoIP 11 sold on the market, referring to Figure 1, connect with a rectifier 12 to insert to a power supply socket through a plug 13 in the other terminal of the rectifier 12, to provide the power supply necessary for normal operation of the VoIP 11, the VoIP 11 can connect with at least one phone 10, and translate voice
10 signal transmitted from the phones 10 to digital signal, and then proceed with packet process, and transmit the formed IP packet out, to transmit the said packet to an internet server 15 through a network switch device 14, and proceed communication on line with remote phone which is provided with similar device through the server 15.

Due to the traditional VoIPs 11 must connect with external power supply to
15 maintain in normal operation, therefore once power failure happened, the VoIPs 11 will make communication off line, which makes communication on line cannot continue, such phenomenon may result in severe influence and inconvenience under some emergency. Thus, to solve the pre-described problem, the VoIP providers specifically increase a line transfer switch on the traditional VoIPs, and through the line transfer
20 switch connects with at least one phones, translate the voice signal transmitted from the phones to digital signal, and then proceed with packeting process through a control circuit equipped thereon to form a IP packet, and then proceed communication on line with remote on-line phone which is provided with similar device through a internet. While the power supply of the VoIPs break, the line transfer switch can be ordered to
25 auto-switch to the mode which connects with a PSTN, which makes the phones can use power supply fed from the central office line of the PSTN to communicate with remote

phones.

Though such kind of solution can solve the trouble that the traditional VoIPs cannot continue communicating while power failure happened, under normal condition, the traditional VoIPs is confined in providing on-line communication service through internet, and cannot enable users to auto-select dial-up of PSTN and internet phone(I-
5 phone) through the traditional VoIPs.

SUMMARY OF THE INVENTION

Whereas the pre-described traditional VoIP cannot auto-select dial-up between
10 PSTN and I-phone, the inventor investigates one kind of VoIP which can auto-select dial-up of PSTN and network telephone and method thereof, the invention is desired to effectively improve the defects of traditional VoIP, and make it possible, in any case, to communicate with remote terminal through the traditional VoIP for dial-up of PSTN or I-phone.

15 One object of the invention is to make a control circuit of the VoIP connect with at least one line transfer switch through a phone detection circuit, respectively, to use the phone detection circuit to detect the status of at least one phone connected with the VoIP, and the circuit transfer switch detects the in-coming call ringing signal transmitted from PSTN through a ringing detection circuit established on a loop, and
20 while the ringing signal is detected, the message will be transmitted instantly to the control circuit such that the control circuit can, according to the phone status detected by the phone detection circuits, trigger a signal to transfer the circuit transfer switches, which makes the unused phone be auto-transferred to status which connects with the loop, to receive the ringing signal transmitted from PSTN, such that the user can
25 communicate with remote phone through the PSTN while picking up the phone.

Another object of the invention is to trigger a signal by the control circuit while

power supply of the VoIP is off, which makes the phones be automatically transferred to status which connects with the loop, such that the phones can communicate with remote phone directly through the PSTN. When the power supply of the VoIP returns to normal, the control circuit can regenerate a trigger signal to make the phones be auto-transferred to proceed on-line communication with remote phones provided with similar device on the internet through a subscriber line interface circuit(SLIC) Therefore, in any case, it is possible to make the VoIP maintain in unimpeded communication status.

Further object of the invention is the control circuit can make the VoIP provide with service for dial-up of PSTN and I-phone in the meantime according to the auto-detection mode set thereon, and make the phones can automatically dial-up of PSTN or I-phone to communicate with remote terminal.

DESCRIPTION OF APPENDED DRAWINGS

Figure 1 shows the schematic diagram of line structure in traditional VoIP;

Figure 2 shows the block schematic diagram of circuit structure in traditional VoIP of the invention;

Figure 3 shows the schematic diagram of system flow of the invention

DETAILED DESCRIPTION

Whereas the VoIP generally connects with at least one phones, transfers the voice signal transmitted from the phones to digital signal, and then proceeds packet process to form IP packet , and uses internet to proceed on-line communication with the phones which provide with similar devices on the remote internet. Such kind of communication processing is much cheaper in communication rate than existed long distance and international call, thus it is with great advantage in development. However, traditionally, the phone use PSTN to proceed communication, due to its power supply is fed from

telecommunication office through central office line, the phone needs no external power supply and can proceed communication directly. Furthermore, due to the communication engine room of the telecommunication office is generally equipped with isolated spare generator, once the electricity supply is broken the spare generator still
5 can instantly supply the electricity, and thus the communication engine room of the telecommunication office can operate normally, and make no influence on the operation of the phone and still can continue communicating externally, so there still are advantages which are hard to be obliterated on the characteristics of traditional PSTN.

The present invention uses above-mentioned function peculiar to VoIP and PSTN
10 to develop a VoIP 21 which can dial-up simultaneously PSTN and I-phone. Referring to Figure 2, in one preferred exemplary of the invention, the VoIP includes mainly a control circuit 213, the control circuit 213 connects with at least one SLIC 212, thus the SLIC 212 can connect with at least one phone 20(it is not limited for the other exemplary of the invention, and can be other terminal devices, such as fax or modem,
15 etc.), respectively, through a line transfer switch 211, and transfer the voice signal transmitted from the phone 20 to digital signal, then proceed packet process through the control circuit 213 to produce corresponding IP packet, and which can be transmitted one by one through a signal line 214, such that on-line communication can proceed with remote phone provided with similar devices on the net through internet.

20 In the embodiment, referring to Figure 2 and 3, the control circuit 213 further connects with the line transfer switch 211 through a phone detection circuit 217, respectively, such that the phone detection circuit 217 can detect the status(on-hook or off-hook) of at least one of the phone 20 connected with the VoIP 21. The line transfer switch 211 is equipped with a plurality of signal contact respectively, wherein one
25 signal contact A connects with the phone 20, another signal contact B connects with the SLIC 212, and the other signal contact C connects with the signal line 214 through a

loop 215. The loop 215 is equipped with a ringing detection circuit 216, through which the in-coming call ringing signal transmitted from PSTN can be detected, and while the in-coming call ringing signal is detected, the message of which is transmitted to the control circuit 213 instantly, such that the control circuit 213 can trigger a signal, according to the status(on-hook or off-hook) of the phone 20 detected through the phone detection circuit 217, to transfer the line transfer switch 211, or can transfer the line transfer switch 211 through the said SLIC 212, to make the unused phone 20(on-hook) be auto-transferred to the status which connects with the loop 215 to receive the ringing signal transmitted from the PSTN, or a local ringing signal is produced through the SLIC 212, such that after subscriber picks up the phone 20, communication with remote phone can sequentially proceed through the loop 215, the signal line 214, and the PSTN.

Furthermore, the control circuit 213 is connected with a rectifier 22, further referring to Figure 2, such that the plug equipped in another terminal of the rectifier 22 can be made to plug in the socket of an external power supply to supply the power required for the control circuit 213 being in normal operation. And the control circuit 213 can depend on the power supply status of the rectifier 22 to produce a trigger signal which makes the line transfer switch 211 proceed transfer operation. Thus, when the power supply for the VoIP 21 is broken, further referring to Figure 3, the control circuit 213 can trigger a signal to make the phones 20 be transferred to the status which connects with the loop 215, such that the voice signal produced by the phones 20 can be directly transmitted outside through the signal line 214. Thus, while the power supply for the VoIP 21 is broken, the phones still can use power supplied by the central office line of PSTN to achieve the object of communicating with remote phone. When the VoIP 21 recovers to normal power supply status, the control circuit 213 will regenerate a trigger signal to make the signal contacts A, B maintain in on-status, such that the voice signal produced by the phones 20 can proceed with on-line communication with

remote phone provided with similar devices on the internet through the SLIC 212 and the control circuit 213. Therefore, in any case, it is possible to make the VoIP 21 maintain in unimpeded communication status.

5 In another preferred embodiment of the invention, the signal contact C can directly be connected with the central office line of the PSTN through the loop 215, and the control circuit 214 can transmit the produced IP packet to the internet through the signal line 214.

10 In further preferred embodiment of the invention, re-referring to Figure 3, the control circuit 213 still can provide the subscriber to self-set the environment of the operation mode according to the set operation procedure thereon, so when the subscriber opens the power supply of the VoIP 21, the desired operation mode can be aimed to proceed with setting. Now, if the control circuit 213 judges that the operation mode set by the subscriber belongs to a auto-detection mode, then through the ringing detection circuit 216 to detect if there is in-coming call ringing signal transmitted from PSTN, if there is any, then according to the status(on-hook or off-hook) of the phones 15 20 detected by the phone detection circuit 217, the control circuit 213 will control the circuit transfer switches 211, or through the SLIC 212 to transfer the circuit transfer switches 211, which makes the unused phone 20(on-hook) be transferred to the status which connects with the loop 215 to receive the ringing signal transmitted from PSTN, 20 which makes the subscriber can receive in-coming call at any time and communicate with remote phone; when the ringing signal disappears and the phone 20 backs to standby status, the control circuit 213 will drive the circuit transfer switches 211, which makes the phone 20(on-hook) be transferred back to the status which connects with the SLIC 212.

25 While subscriber calling through the phones 20, the control circuit 213 will aim at the phone number dialed by the subscriber to judge which belongs to a PSTN of a I-

phone, and bases on which to control the circuit transfer switches 211, which makes the used phone 20(on-hook) be transferred to the status which connects with the loop 215 or the SLIC 212, which makes it possible to communicate with remote phone through PSTN or I-phone, respectively.

0903491 062601
"09090" T6492850